Professor Andre Khalil
Chemical and Biomedical Engineering

Publications

Refereed Publications


**Books**


**Refereed Conference Proceedings**


Conference Proceedings and Abstracts


Industry Reports


74. Khalil, A, Mason, MD 2006. Image Analysis of Soft-Tissue In-Growth into and Attachment to Alumina Ceramic Foam for Canines, Stryker Orthopaedics, (14 pages).
**Data sets**

75. Liu, J, Enderlin, E, Khalil, A, Marshall, HP 2021 *Dataset for Time Series of Terminus Position for Glaciers Along the Periphery of Southeast Greenland* [Data set]. https://doi.org/10.18122/cryogars_data.1.boisestate

**Theses Advised**

**Doctoral Theses**

1. Wu, Yongfeng, Ph.D. Astrophysics 2010. ‘*Multi-Scale Three-Dimensional Analysis of Galaxy Distributions Using the Metric Space Technique*’ (Co-Chair).


3. Toner, Brian, Ph.D. Computer Science and Spatial Information 2019. ‘*3D Modeling of Tumor Onset and Development in Simulated Breast Tissue*’.

4. Batchelder, Kendra, I.Ph.D. Computational Biomedicine 2023 (expected). ‘*Longitudinal analysis of mammographic microenvironment tissue disruption accompanying tumorigenesis*’.

5. Seekins, Tyler, Ph.D. Chemical Engineering 2023 (expected). ‘*Computer vision for paper fiber quantification*’. (Co-chair with Dr. Douglas Bousfield).


7. Miner, Jordan, Ph.D. Biomedical Engineering 2025 (expected). ‘*Quantitative imaging of culture and native breast tissue sample*’. (Co-chair with Dr. Karissa Tilbury).

8. Joshua Hamilton, Ph.D. Biomedical Engineering 2026 (expected). ‘*Multiscale anisotropy analysis of cancer microenvironment tissue*’.

**Masters Theses**


10. Robitaille, Jean-Francois, M.S. Astrophysics 2008. ‘*Analyse Metrique de Structure HI dans le Plan Galactique*’ (Co-Chair at Université Laval, QC, Canada).


12. Potter, Matthew, M.A. Mathematics 2010. ‘*Prime Modulo and Pascal’s Triangle As Seen With Fractal Geometry*’.

13. Mooers, Kendra, M.A. Mathematics 2013. ‘*Characterization of Mammographic Breast Lesions And Their Microenvironment: An Application of a Wavelet-Based Multifractal Formalism*’.

14. Cox, Derrick, M.A. Mathematics 2014. ‘*Computational Analysis of Mammographic Breast Tissue Using the Metric Space Technique*’.


21. Hamilton, Josh, M.S. Biomedical Engineering 2022. ‘Anisotropy analysis of collagen architecture in pancreatic and breast tumor tissue slides.’ (Co-chair with Dr. Karissa Tilbury)

22. Raza, Madison, M.S. Biomedical Engineering 2023 (expected). ‘Mammographic tissue microenvironment assessment using the Metric Space Technique’.

23. McCarthy, Margaret, M.S. Biomedical Engineering 2023 (expected). ‘Quantitative visualization of mammographic tissue microenvironment disruption’.


Honors Theses


30. White, Basel, B.S. Biomedical Engineering 2021. ‘Automated segmentation of breast tissue from mammograms.’
Publications of Professor Andre Khalil

Patents


Oral Presentations

Keynote and Invited Seminars & Presentations:

   Invited talk: Imaging software for cancer risk assessment

2. July/August 2021: EXPLO: Learning Through Exploration, Colby College, Waterville, ME

3. June 2021: Laboratoire Ondes et Matieres d’Aquitaine, Universite de Bordeaux, France
   Invited talk: Loss of mammographic tissue homeostasis in breast carcinomas

4. January 2021: Bioscience Association of Maine (BIOME) Virtual Coffee Hour
   Invited talk: Novel computational technology to pre-detect breast cancer: Moving towards commercialization

5. October 2020: SFtools-bigdata: The close structural connection between gas and young stars focus on current and new tools of data analysis, Université Grenoble Alpes, France
   Invited talk: Overview of applications of the 2D Wavelet Transform Modulus Maxima method

6. March 2020: National Cancer Institute, Div. of Cancer Epidemiology and Genetics, Rockville, MD
   Invited talk: Characterization of loss of tissue homeostasis in mammographic breast tumor microenvironment

   Invited talk: Image analysis for x-ray, 3D holography, DIC, confocal, widefield, 2-photon fluorescence and Second Harmonic Generation Microscopies

8. October 2019: The Jackson Laboratory Seminar Series
   Invited talk: Computational Engineering at CompuMAINE

9. September 2019: IDEXX Artificial Intelligence / Machine Learning Annual Symposium, IDEXX Laboratories, Westbrook, ME
   Keynote talk: Loss of tissue homeostasis in breast tumor microenvironment

10. January 2019: Centre de Recherche Mathématiques, Université de Montréal, QC, Canada
    Invited talk: Loss of tissue homeostasis in breast tumor microenvironment


12. November 2018: Pi Mu Epsilon Career Day, University of Maine, Orono, ME
Invited talk: A career as an applied mathematician

13. April 2017: UMaine Marches for Science, University of Maine, Orono, ME
   Invited speech: The Need for Fundamental Science

14. January 2016: Department of Chemical/Biological Engineering, University of Maine, Orono, ME
   Invited talk: Fractal Analysis of Mammographic Breast Lesions and Characterization of Loss of Tissue Homeostasis in Tumor Microenvironment

15. January 2016: Landmark College, Putney, VT
   Invited talk: The CompuMAINE Laboratory: Overview of Past and Current Activities

16. November 2015: Department of Physics and Astronomy, University of Maine, Orono, ME
   Invited Talk: Fractal Analysis of Mammographic Breast Lesions and Characterization of Loss of Tissue Homeostasis in Tumor Microenvironment

17. February 2015: Graduate School of Biomedical Sciences and Engineering, University of Maine, Orono, ME
   Invited Talk: The CompuMAINE Laboratory

18. May 2013: Maine Cancer Consortium Annual Meeting, Jackson Laboratory, Bar Harbor, ME
   Panel Discussion: Cutting-Edge Cancer Research in Maine (invited as one of four cancer research experts from Maine)

19. November 2012: Ecole Normale Superieure de Lyon, France
   Invited Talk: Breast Cancer and Leukemia: On-Going Projects From The CompuMAINE Lab

20. August 2012: Signal Processing and Image Analysis Interest Group, The Jackson Laboratory, Bar Harbor, ME
   Invited Talk: Fractals in Mammograms and Wavelets in Chromosomes: Signal Processing, Image Analysis and Modeling

21. April 2012: University of Maine School of Biology and Ecology Colloquium Series
   Invited Talk: Fractals in Mammograms and Wavelets in Chromosomes

22. April 2012: Maine Biological and Medical Scientific Symposium, Salisbury Cove, ME
   Invited Talk: Biomedical Image and Signal Processing, Analysis, and Modeling

23. November 2011: Medical Research Council, Imperial College London, England
   Invited Talk: Computational Analysis of Chromosome Territories

24. November 2011: Kirchhoff Institute for Physics, University of Heidelberg, Germany
   Invited Talk: 3D Modeling of Chromosome Territories

   Invited Presentation Display: Breast Cancer: Wavelet-Based Image Analysis of Mammograms
   Invited Presentation Display: Computational Pathology: 3D Structure of Chromosome Territories during Progression to Malignancy

Invited Talk: Fractals and Wavelets

   Invited Presentation Display: Breast Cancer: Wavelet-Based Image Analysis of Mammograms

28. November 2008: The Jackson Laboratory, Bar Harbor, ME
   Invited Talk: Signal Processing and Image Analysis with the WTMM Method

29. June / July 2008: Graduate School of Mathematical and Computational Methods for the Sciences, University of Heidelberg, Germany
   Invited Seven-Part Lecture Series (14 hours): The Wavelet Transform Modulus Maxima Method: Image Analysis Lecture Series

30. July 2008: Kirchhoff Institute for Physics, University of Heidelberg, Germany
   Invited Talk: Wavelet-Based Characterization of Chromosome Territories

31. July 2008: Laboratoire Joliot-Curie, Ecole Normale Superieure de Lyon, France
   Invited Talk: Morphological Analysis of Slow and Fast Muscle Cells in Zebrafish Embryos

32. June 2008: Department of Applied Physical Chemistry, University of Heidelberg, Germany
   Invited Talk: Image Analysis with the Wavelet Transform Modulus Maxima Method

33. May 2008: Pizza Pi, Department of Mathematics, University of Maine, Orono, ME
   Invited Talk: Building a bridge to nowhere and everywhere

34. May 2008: First Annual Meeting of the Graduate School of Biomedical Sciences, University of Maine, Orono, ME
   Invited Talk: Breast Cancer: Wavelet-Based Characterization of Microcalcification Clusters

35. March 2008: Department of Radiology, University of California, San Francisco, CA
   Invited Talk: Wavelet-Based Image Analysis

36. October 2007: McGill University, Department of Biomedical Engineering, Montreal, Canada
   Invited Talk: Wavelet-Based Characterization of Chromosome Territories

37. May 2007: Functional Imaging of the Cell Nucleus, Lyon, France
   Keynote Talk: Wavelet-Based Characterization of Chromosome Territories

   Invited talk: 2D and 3D Signal Processing Tools for Bio-Medical Image Analysis

   Invited talk: Wavelets and Fractals: From Astrophysics to Bio-Medical Image Analysis

40. February 2005: Department of Physics and Astronomy, University of Maine
   Invited talk: Wavelets and Fractals: From Astrophysics to Bio-Medical Image Analysis
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41. January 2005: Department of Spatial Information Science and Engineering, University of Maine
   Invited talk: Wavelets and Fractals: From Astrophysics to Bio-Medical Image Analysis

42. November 2000: International Symposium on the Applications of Fractal Techniques in Biology and Medicine, Montréal, Canada
   Invited talk: Morphological Analysis of Molecular Clouds: A Multi-Tool Analysis

Other Presentations

43. November 2022: Annual Meeting of the Radiological Society of North America, Chicago, IL
   Oral talk: Computational Assessment of Healthy vs. Risky Mammographic Breast Density.

   Oral talk: Quantitative Visualization of Healthy vs. Risky Mammographic Breast Density.

45. December 2019: San Antonio Breast Cancer Symposium, San Antonio, TX
   Poster: Exploratory Computational Longitudinal Analysis of Mammographic Microenvironment Disruption Preceding Breast Tumorigenesis.

46. April 2019: 46th Maine Biological and Medical Sciences Symposium, MDI Laboratory, ME
   Poster: The CompuMAINE Laboratory

47. April 2017: 44th Maine Biological and Medical Sciences Symposium, MDI Laboratory, ME
   Poster: Wavelet-Based Particle Tracking in Unreconstructed, Off-Axis Holograms

48. April 2016: 43rd Maine Biological and Medical Sciences Symposium, MDI Laboratory, ME
   Talk: The CompuMAINE Lab

49. September 2012: Department of Physics and Astronomy, University of Maine, Orono, ME
   Talk: The CompuMAINE Laboratory

50. April 2012: Maine Biological and Medical Scientific Symposium, Salisbury Cove, ME

51. March 2012: University of Maine Graduate School of Biomedical Sciences Student Reception, Orono, ME
   Talk: Computational Image Processing in Biomedicine.

52. September 2010: University of Maine Graduate School of Biomedical Sciences Annual Meeting, Orono, ME
   Poster: Probabilistic Modeling of 2D Foci Counts with Respect to Radial Distribution
   Poster: Enhanced 3D Segmentation of Fluorescence Microscopy Images

53. February 2010: University of Maine Graduate School of Biomedical Sciences Student Reception, Orono, ME
   Poster: Pore size and morphology modulate patterning of soft-tissue in-growth into porous titanium implants based on novel imaging tools
   Poster: 2D and 3D Signal Processing Tools for Bio-Medical Image Analysis
54. February 2010: University of Maine Graduate School of Biomedical Sciences Student Reception, Orono, ME  
Poster: Pore size and morphology modulate patterning of soft-tissue in-growth into porous titanium implants based on novel imaging tools  
Poster: 2D and 3D Signal Processing Tools for Bio-Medical Image Analysis

55. September 2009: University of Maine Graduate School of Biomedical Sciences Annual Meeting, Orono, ME  
Poster: Pore size and morphology modulate patterning of soft-tissue in-growth into porous titanium implants based on novel imaging tools  
Poster: 2D and 3D Signal Processing Tools for Bio-Medical Image Analysis

56. August 2009: Nano and Micro Technology Workshop, Mount Desert Island Biological Lab, Salisbury Cove, ME  
Talk: Multifractal analysis of actigraphy signals

57. June 2009: Physics of Complexity, Ecole Normale Superieure de Lyon, France  
Poster: Pattern of soft-tissue in-growth into porous implants based on novel imaging tools  
Poster: Pore size and morphology modulate patterning of soft-tissue in-growth into porous titanium implants based on novel imaging tools  
Poster: 2D and 3D Signal Processing Tools for Bio-Medical Image Analysis

Poster: Pore size and morphology modulate patterning of soft-tissue in-growth into porous titanium implants based on novel imaging tools

Poster: Pattern of soft-tissue in-growth into porous implants based on novel imaging tools

60. February 2008: Institute for Molecular Biophysics Annual Meeting, Bar Harbor, ME  
Poster: Enhanced 3D Segmentation of Fluorescence Images

Talk: Biomedical Image Analysis and Modeling

Poster: 2D and 3D Signal Processing Tools for Bio-Medical Image Analysis

Poster: 2D and 3D Signal Processing Tools for Bio-Medical Image Analysis

Poster: 2D and 3D Signal Processing Tools for Bio-Medical Image Analysis

Poster: 2D and 3D Signal Processing Tools for Bio-Medical Image Analysis

Poster: 2D and 3D Signal Processing Tools for Bio-Medical Image Analysis
67. September 2005: Annual Scientific Advisory Board Meeting for the Institute for Molecular Biophysics, The Jackson Laboratory, Bar Harbor, ME  
**Talk:** On the Development and Use of Rigorously Well-Defined, Quantitative, and Objective Image Analysis Tools: Keeping Up With Technological Advancements

**Talk:** Fractals & Wavelets: New Projects and Early Results

**Talk:** Wavelet-Based Multifractal Formalism: Anisotropy... at all scales

70. March 2004: Scientific Meeting of the Centre de recherche de l’Observatoire du Mont-Mégantic, Lac-Estérel, QC, Canada  
**Talk:** Modélisation de la structure anisotrope du HI à grande échelle

71. September 2003: Annual Meeting of the Québec Astrophysics Graduate Students from Universities Laval, McGill, and de Montréal, Montréal, Canada  
**Talk:** Analyse de la structure du milieu interstellaire

72. June 2003: Society of Industrial and Applied Mathematics (SIAM) meeting, Montréal, Canada  
**Talk:** Morphological Analysis of Galactic Neutral Hydrogen

73. May 2003: Association Francophone pour l’Avancement des Sciences (ACFAS) 76th Annual Meeting, Rimouski, QC, Canada  
**Talk:** Analyse de la structure du milieu interstellaire. **Poster:** L’introduction du spectre de mesures de Hausdorff pour la caractérisation de structures de même dimension fractale

74. April 2003: International Galactic Plane Survey Consortium (IGPS) Meeting, Québec, Canada  
**Talk:** Morphological Analysis of Galactic Neutral Hydrogen

75. March 2003: Scientific Meeting of the Centre de recherche de l’Observatoire du Mont-Mégantic, Lac-Delage, QC, Canada  
**Talk:** Analyse morphologique de l’hydrogène neutre à grande échelle

76. September 2002: Annual Meeting of the Québec Astrophysics Graduate Students from Universities Laval, McGill, and de Montréal, Montréal, Canada  
**Talk:** Analyse morphologique de l’hydrogène neutre

77. March 2002: Fractal 2002, Complexity and Fractals in Nature 7th Interdisciplinary Conference, Grenada, Spain  
**Poster:** Morphological Analysis of Astrophysical Clouds

78. October 2001: « Seeing Through the Dust » International Conference, Penticton, BC, Canada  
**Talk:** Exotic Tools for the Morphological Analysis of Neutral Hydrogen Clouds

79. September 2001: Annual Meeting of the Québec Astrophysics Graduate Students from Universities Laval, McGill, and de Montréal, Québec, Canada  
**Talk:** Multifractales et Ondelettes